

Laboratory Seed Production of the Carpet Shell Clam (*Paphia undulata*)

SHAMSUDDIN SALLEH

WONG TAT-MENG

LIM TECK-GHEE

Universiti Sains Malaysia

Penang, Malaysia

Carpet shell clams (*Paphia undulata*) occur in many coastal mudflats of Thailand, Malaysia and the Philippines, where they contribute to important regional or local fisheries. Landings of *Paphia* clams in Thailand in 1978 were estimated at 10,654 t, worth 32 million baht ($\$1.4 \times 10^6$); Malaysia reported 1,995 t in 1984.

In Thailand, landings of *Paphia* clams have decreased steadily in the 1980s, while in Malaysia efforts to increase carpet shell clam production through aquaculture have been hampered by the absence of seed supply.

In an attempt to address this problem, scientists from Universiti Sains Malaysia, with funding support from the International Labour Organisation and the Government of the Netherlands, have researched the possibility of seed production by artificial means as part of a program to develop appropriate bivalve seed production technology for subsequent transfer to the rural fishing community.

Spawning in *Paphia* was successfully induced by injection of 0.5 ml of 2×10^{-3} M serotonin into their foot tissues. Release of sperm and eggs occurred with-



Adult *Paphia undulata*.

in 0.5-2 hours of receiving the injections. In both sexes, discharge of gonadal products occurred intermittently via the extended exhalent siphon for up to 45 minutes. Females released up to 1.5 million eggs during this period.

Eggs were approximately 61 μm in diameter. Fertilized eggs underwent rapid cell division and four hours after spawning, the first swimming trochophores were seen. D-stage larvae first appeared between 16 and 20 hours. Day old veligers measured 65-70 μm in shell length.

Left: Late D-early umbo larvae. Right: Settled spat.

Reared on microalgae (*Isochrysis* sp.), the veliger larvae developed through the D-stage in five days and passed through the mid-umbo and pediveliger stages by the 8th and 12th day, respectively. Settlement was completed by the 15th day when shell length was 324 μm . Metamorphosis into the juvenile form, characterized by the complete development of gills, siphons and appearance of pigment patches on the shells, was completed by the 18th day.

Juveniles showed rapid growth when fed a diet of mixed brown cells using an upwelling system. Mean shell lengths reached 17.9 mm three months after settlement, during which good survival rates were recorded.

With its shorter planktonic larval phase, a faster larval and juvenile growth rate as well as a higher market price for adults, *Paphia* clams appear to be, from the hatchery seed production viewpoint, a more attractive species compared to the cockle (*Anadara granosa*) (see ICLARM Newsletter, Oct. 1985).

Studies are in progress to determine the environmental conditions and feeding regimes for optimal growth and seed production as well as other aspects of the breeding biology of this species. ●

